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THESIS FOR THE DEGREE OF DOCTOR OF MEDICINE.

UNIVERSITY OF EDINBURGH.

An enquiry into all cases of Puerperal Sepsis
notified in the City of Birmingham during a
period of twelve months.

(October 1921 to October 1922).

{ With a description of the methods employed in
{ midwifery practice among the working classes,
{ and with comments and suggestions.

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I N T R O D U C T I O N .

The inquiry of which details are given in this paper was made with a view to ascertaining if any steps could be taken to lower the incidence and mortality from puerperal sepsis, which has not shown a satisfactory decrease in Birmingham. The supervision of the midwives is carried out efficiently, and excellent relations prevail between the Midwives Inspectors and the Midwives, so that it is possible to obtain a fairly high standard in midwifery. On the whole the management of labour by the local midwives was known to be satisfactory taking into consideration the conditions in which they work and the standard expected under the rules of the Central Midwives Board, and it was obvious that sepsis was not more prevalent among the less efficient, and less well trained women, so that it seemed certain that other factors were responsible, apart from general cleanliness.

Facts relating to a proportion of these cases have been sent to the Ministry of Health, by whom some investigations are being undertaken, but it is from the local rather than the national standpoint that the question is dealt with here. The facts, however, do not point to any local influence at work, and it seems probable that the number of notifications in this city is related to the facilities for Hospital treatment now available. Excellent accommodation is set aside at the poor-law hospitals but in addition the Corporation have secured treatment in the Women's Hospital by a grant-in-aid, and every notified case of puerperal sepsis can be admitted there if desired.

The case incidence per 1,000 of the population was fairly high in Birmingham in 1921, but was higher still in Manchester and Sheffield, and yet in Leeds and Liverpool where conditions are comparable, the case incidence was much lower. In three of these towns "puerperal fever" is treated in the Infectious Disease Hospital, but in Sheffield, 2 beds are set

aside in the Women's Hospital. In Nottingham where no special provision appears to be made the case incidence was at a minimum.

The Mortality per 1,000 births from puerperal sepsis is a more reliable figure than the case incidence, and in this Birmingham is below all the larger cities except Bristol. It may, therefore, be taken for granted that the conditions described in the following pages are not below the average standard in the country.

	<u>Case Incidence.</u> Per 1,000 of the Population.	<u>Mortality.</u> Per 1,000 Birth.
England & Wales.	0.06	1.38
London	0.08	1.42
Birmingham	0.11	1.21
Manchester	0.23	1.94
Liverpool	0.07	1.83
Leeds	0.07	1.28
Sheffield	0.12	1.68
Bristol	0.08	0.60
Nottingham	0.03	1.30

All cases of puerperal sepsis notified during a period of 12 months in the City of Birmingham have been investigated personally, inquiries having been made from the doctors, midwives and institutions, and the patients themselves in almost every case have been seen and questioned. The number of cases notified during the period was 129, of these 35 were abortions and the remaining 94 were labours in which the period of pregnancy was over 7 months. Of these 94, 5 were not cases of puerperal sepsis and 89 were such cases. It is proposed to first consider the non-septic cases, then the cases of true puerperal sepsis, and then the abortions.

THE NON-SEPTIC CASES, 5.

These are chiefly of interest as showing that a proportion of all notified cases of puerperal sepsis are not really of this nature, and the reason for the mistaken diagnosis is also of interest. Each case will be detailed.

Case I. Pyelitis. Patient found to be suffering from pyelitis, which originated during her pregnancy, and of which there was an acute exacerbation during the puerperium. The patient had consulted her doctor during pregnancy, but the condition was not diagnosed, no examination of the urine was made, though the doctor was consulted at the 8th month. The symptoms were :- severe headache and marked rigor, pain in the back, abdomen and limbs. The confinement was normal, the patient was a multipara and was only in labour 6 hours, she was attended by a midwife. On the 5th day she had a rigor, severe headache and abdominal pain. The midwife called in a medical practitioner, who notified the case as one of puerperal fever, and sent the patient to the Women's Hospital, where a definite diagnosis of pyelitis was made, and no symptoms of puerperal sepsis were found.

Case II. Scarlet Fever. The patient was a multipara and had a normal full time labour, attended by a midwife, but the child was born before her arrival. On the 3rd day she had a headache and felt ill, her temperature was 103° pulse 132. She had a sore throat and a rash. The midwife called in a medical practitioner at once, Vaginal douching and an enema were ordered. The treatment was continued till the 7th day, when the woman was notified as a case of puerperal sepsis, and sent into Hospital. On the 9th day desquamation commenced, and scarlet fever was diagnosed, the patient was transferred to the Fever Hospital. There was no puerperal sepsis. Six weeks previously a child was removed from the home suffering from scarlet fever, and the elder daughter had suffered subsequently from sore throat.

Case III. Mammary Abscess. The patient was a primipara, and had a full time, normal confinement in Hospital, and a normal puerperium, being discharged on the 11th day. On the 15th day she began to have pain in one breast and sent for the doctor, her temperature was 103°, and she was notified as a case of puerperal sepsis, and sent to Hospital. Here she was found to have a breast abscess, which was incised, she was also found to have syphilis, and was treated with Kharsivan.

Case IV. Acute Bronchitis. The patient was a multipara, 8th pregnancy, the labour was normal. The baby later had Ophthalmia neonatorum. On the 5th day the patient had a temperature of 102° with a quick pulse, headache and sweating. A medical practitioner was called in by the midwife in attendance. On the following day Hospital was recommended, and the patient was admitted on the 7th day. In hospital she was found to be suffering from acute bronchitis and laryngitis. No puerperal sepsis existed. Some thickening of the broad ligaments was diagnosed as being due to an old parametritis. She was discharged well in a fortnight.

Case V. Chronic Nervous Disease. The patient was a multipara, she had a normal labour and had been quite well up to the 10th day, when the midwife ceased attendance. She had, however, complained of headaches for months and continued to do so. The patient on attempting to get about found she had much weakness in the lower limbs and some dimness of vision. Both these symptoms had existed prior to the confinement, and the midwife had noticed a definite deterioration in the patients habits as compared with previous occasions when she had attended her. A medical practitioner was called in during the 3rd week and advised her removal to Hospital. A very incomplete history was given. There was facial paralysis, nystagmus, indistinct speech, increased reflexes, a double Babinski, and weakness of groups of muscles in the upper and lower limbs; no tremor or sensory disturbance was noticed. The pelvis was found to be clear, but there was some vaginal discharge. It was considered when the patient was first seen that there had been a cerebral embolus, following puerperal sepsis, and the case was notified. Later, however, this diagnosis was withdrawn, and one of possible disseminated sclerosis substituted.

The fifth case needs no comment, but it will be noted that ^{the} four previous cases were midwives cases to which the medical practitioner was called, and finding a high temperature during the puerperium notified the case as one of puerperal sepsis for admission to Hospital. While this was a perfectly correct procedure, it points to the need for checking notifications from the subsequent history.

Midwifery Practice. The inquiry proved of particular interest as showing in great detail the ordinary methods of conduction, labour, in a large midland city, among the working class, and the lower middle class. A noticeable feature is the absence of notifications among what might be termed the upper middle class, and the upper classes. This might be due to some extent to smaller incidence of puerperal sepsis among the latter. With the more favourable conditions under which labour is conducted, and the greater care that is exercised in difficult cases, this appears very probable, but when one considers the nature of the cases notified from institutions, where an elaborate and careful technique is practised, and when one considers the comparatively large number of cases, where sepsis appears to have followed an unsuspected injury, or incomplete evacuation, one is bound to suspect that this cannot be the sole reason for the absence of notifications from among the upper classes, and that a small number of cases probably do occur, and are not notified.

(a) A brief general survey of the methods of the midwife may first be made, since the midwives are responsible for the greater number of the confinements in this city. In 1921 the proportion of confinements attended by midwives was 65%.

The usual practice is for a pregnant woman to engage her midwife about the 7th month, some leave it much later, and others book as early as the 4th or 5th month, as a rule the patient visits the midwife in her own house and a few questions are asked, and the expected date of the confinement determined.

Occasionally in the poorer areas, and especially with multipara, the actual booking is done in the street, as the midwife goes about her daily work. This practice is not encouraged by the better type of midwife, who also explain to their patients what is required for the confinement.

In the past very few of the midwives examined the urine, they are now being pressed by the Local Supervising Authority to do this, or to send the patient to an Ante-natal Clinic for that purpose. They are also being pressed to send all primipara to Ante-natal Clinics, and also all multipara who

have had difficult labours, or repeated stillbirths and miscarriages.

A distinct improvement has been effected, and it is of interest to note that in 1921, 6141 Ante-natal cases attended the Ante-natal Clinics, the number of births in families visited from the Centres being 19,360, giving an attendance of 32%, and in 1922 the corresponding figures were 6169 with 16,037 births giving 38%. The majority of the women attending the Ante-natal Clinics are midwives cases, though a proportion of doctor's cases also attend. The booking having been done by the midwife, nothing more is thought of the case till she is asked to attend the labour.

The women themselves are now well aware of the importance of cleanliness and care at the time of labour, and all but the lowest class make some preparations. Very frequently the bedroom is papered, it is generally scrubbed out, and thoroughly "spring cleaned", the bed linen is washed, and a clean supply of personal linen is also prepared. Rags are boiled and washed for pads, cleaned boiled curtain material being a favourite form of pad. Some degree of personal cleanliness is also obtained in all but the worst cases. The midwives prepare the patients with a fair amount of care, soap and water, and lysol, are freely used. There is a tendency to make too many Vaginal examinations especially among the older women. None of the midwives appear to practice abdominal examination. The examination of the placenta appears to be done in every case, with care, but mistakes occur with somewhat surprising frequency. The midwives clear up after labour in a satisfactory way, but in some of the poorer homes they can obtain no suitable perineal dressings.

If the labour occurs in the morning, or early afternoon, the practice is to visit the patient again that day, and take the temperature, and pulse, and change the perineal pads. Two visits are paid on the 2nd day, and after that only one visit a day is paid. It is obvious that a temperature record taken once daily, and generally in the morning, cannot be considered a very satisfactory indication of the patient's condition, nor can it be considered enough to change the pads and swab the patient once daily during the first week. The patients themselves are very reluctant to complain to the midwife, and often conceal symptoms, such as headache, abdominal pain, and even rigors. While the midwife is inclined to put these down to a cold, influenza, after pains, or constipation.

The rule allowing a midwife to wait 24 hours after a rise of temperature above 100.4° encourages delay in sending for medical assistance, when early and energetic treatment undoubtedly diminishes risks. Moreover if the temperature falls within the 24 hours, and rises again a day or two later, a further delay of 24 hours is considered justifiable, or without any further rise, the midwife may give up the case at the 10th day, and symptoms of a serious nature may develop later, as illustrated among the cases in the present inquiry. In an overwhelming proportion some indication of sepsis given during the 10 days of the puerperium, while the midwife attends.

The fact is that the majority of midwives attend too many cases to do their patients justice, and in order to meet their difficulties the whole standard of nursing required from the midwife is fixed too low. At the present time a midwife cannot make a good living if she attends less than 200 or 300 cases a year, getting as she does an average of 25/- per case, and taking bad debts into consideration. To obtain satisfactory midwifery not more than 100 cases a year should be taken. This involves 2 labours a week, and (with 2 visits a day per patient) 8 visits per day, to which at least 8 hours should be given, allowing for getting from house to house. This will be considered too small a number by many, but allowing for ante-natal work, and a high standard of midwifery, I do not think, after fair consideration, it can be considered unreasonable.

Judging from the evidence available there is as a rule no hesitation on the part of the midwives in sending for a medical practitioner in case of any serious delay or difficulty during labour; and where there is delay in sending during the puerperium it is due to the reluctance to believe that anything untoward is threatened, or even more frequently, the failure to observe the onset of abnormal symptoms.

(b) It is regrettable that the medical practitioners do not arrange for the presence of the midwife when they are visiting the patient, so that the midwife received detailed instruction as to the nursing and general care of the patient. In many cases the midwife does not see the doctor unless she meets him accidentally at the house, or unless she calls personally on the doctor to obtain information. // In considering the cases where the doctor was engaged for the confinement, it is noticeable that the engagement of a handy-woman is permitted in a large proportion of cases (including in a few cases the patients relatives). This would matter little if the doctor conducted the labour

himself, and made himself responsible for all the necessary swabbing and other preparations, but this is not the case. These untrained women do all the necessary preparation of the patient, and even make repeated Vaginal examinations, simply sending, in many instances, for the medical practitioner when labour is well advanced. The handy-woman is frequently recommended to the patient by the doctor, and the patient in some cases believes she is employing a certified midwife. In other cases the handy-woman is employed for economy, but the use of this type of untrained and unreliable assistant would be much less frequent if the medical practitioners refused to countenance it. A proportion of the medical practitioners use modern methods of asepsis, and wear sterilised gowns and gloves. The greater number are still not doing this, a towel frequently suffices to prevent staining of garments, and gloves are seldom used even in difficult deliveries. There is also a marked tendency to use instruments simply to hurry things up, often with disastrous results. During the puerperium the doctor usually pays a daily visit for 3 or 4 days, and then every 2nd day till the 10th day, except where distances are great, and where there are heavy calls on his time, then 2 or 3 visits in the puerperium suffice. It is not usual to do more than take the temperature and pulse, and enquire as to the condition of the lochia and bowels. All the actual nursing of the patient is left to the handy-woman. If the perineum has been stitched, however, the stitches are removed by the doctor. The result of this method of dealing with cases is that early symptoms of infection are frequently overlooked.

In this city a proportion of the confinements are attended by medical students, who are accompanied by a midwife. The midwife is expected to pay an Ante-natal visit to see that suitable preparations have been made, and the management of labour is in her hands and those of the students. In the puerperium the care of the patient is left chiefly to the students, and any relative or handy-woman who may be available, the midwife simply paying a daily call to take the temperature and pulse. Four of these cases developed puerperal sepsis, one case proving fatal. As only a small area of the city is intended in the scheme for teaching medical students the number of cases is not negligible.

Statistical Analysis.

I. From the accompanying table it will be seen that omitting the institutional cases, and those attended by medical

students, doctors were primarily in attendance in 27 cases, or 30%, and midwives in 42 cases, or 48%. This must be taken with the fact that the midwives normally attend 65% of all confinements, so that the percentage of puerperal sepsis in midwives cases is not unduly high. The figure for the midwives also includes 11 cases where the actual deliveries were carried out by doctors, as will be seen by the notes which follow, and the corrected figures should be doctors cases 37, midwives cases 31, which makes the percentages 41% and 34% respectively.

The statement is frequently made that the doctors are called to ~~keep~~^{help} midwives after there have been many vaginal examinations, increasing the risk of sepsis in the subsequent operations. In none of the cases as far as could be ascertained were these examinations made without antiseptic precautions, and the numbers made are given below.

From these figures it seems obvious that puerperal sepsis is less frequent in cases attended by midwives simply because there is major interference in a smaller proportion.

* In this connection a recent enquiry into ^mMaternal mortality in the United States by Dr. Levy is of interest. His primary conclusion is "That mortality rates are not unfavourably influenced by the percentage of births attended by midwives" and that "the lowest rates are frequently found with the highest percentage of births attended by midwives".

ATTENDANCE.

Doctor & Handywoman	14	} Dr. cases 38.
Doctor & Midwife	10	
Doctor & Midwife (Hospital)	11	
Doctor & Relative	3	
Midwife alone	30	} Midwives cases 51.
Midwife & Doctor (called during labour)	12	
Midwife (Institution)	5	
Medical Students & Midwife	4	

* { Maternal Mortality and Mortality in the First Month of Life
by Julius Levy M.D. American Journal of Public Health.
February 1923. }

It will be seen that in 12 cases the midwife called a medical practitioner to her assistance during labour. The reasons for seeking assistance, with brief notes are given below with the number of Vaginal examinations made by the midwife before calling in the doctor.

1. Ante partum haemorrhage due to Central Placenta Praevia, delivered in Hospital. No Vaginal Examination.
2. Membranes apparently left behind in a B.B.A. case. Uterus explored manually. Membranes found in bed clothes later. No Vaginal Examination.
3. Marked oedema of V^vulva, Forceps used. Manual removal of placenta. Incomplete evacuation. 2 Vaginal Examinations.
4. Nervous primipara. Relatives requested that doctor should be sent for. Forceps used. Severe injury and incomplete evacuation. 3 Vaginal Examinations.
5. Primipara, Said to be delay in 2nd stage. Total duration of labour 13½ hours. Forceps used. Severe injury. 3 Vaginal Examinations.
6. Primipara, Said to be uterine inertia. Total duration of labour 21 hours. Midwife sent for doctor after 1 hours attendance. Forceps used. Manual delivery of placenta. Severe injuries and incomplete evacuation. 1 Vaginal Examination.
7. Multipara, Uterine Inertia, Forceps used. 2 Vaginal Examinations.
8. Persistent Occipito-posterior position See "Deaths" Case I. 3 Vaginal Examinations.
9. Breech presentation. Difficulty with after-coming head. See "Deaths" Case V. 2 Vaginal Examinations.
10. General exhaustion. See "Deaths" Case VIII. 2 Vaginal Examinations.

11. Delay in 2nd stage, 6 previous instrumental deliveries, but last labour normal.
See "Deaths" case XII. No Vaginal Examination.
12. Uterine inertia. See "Deaths" case XV.
3 Vaginal Examinations.

II.

In considering the apparent cause of the onset of ^{ep}sp^{is} it appeared advisable to classify according to the whole possibilities of the case. It will be seen that incomplete evacuation and injury were actually present alone or together in 65 of the 89 cases, (73%), incomplete evacuation was found and reported in 47 cases, (52%) and injury in 44 (49%). In 13 cases nothing could be found to account for the condition (14%), while in 3 the conditions during labour were very bad, and in 8 there was some form of interference.

Cases in which the conditions of labour might be held to account for infection.

- (a) Twin birth, first child born in lodgings without any preparations being made, and the second in the poor law institution, where the mother was taken in an ambulance. No antiseptic dressing applied before removal.
- (b) Midwife and two doctors examined patient ^vaginally and all three made a mistaken diagnosis of placenta praevia. There was then partial dilatation and haemorrhage. The patient was removed by Ambulance to Hospital where she delivered herself of a macerated premature foetus, breech presenting.
- (c) The midwife was sent for ^{while} at another confinement. She sent her pupil, who arrived to find the patient on the floor, and the baby born, the placenta was expelled before anything could be done. All the surroundings were very dirty.

Of the labours 52 were normal with no interference

beyond the usual vaginal examinations, 29 were instrumental and in 8 there was some interference. From these figures it will be seen that in 39 (75%) apparently normal labours there was injury, incomplete evacuation, or both. Where the cervical injury occurred alone as it did in nine cases, its presence was not suspected, and in the same way the presence of placental and membranous fragments in the uterus was not considered possible, even in cases where considerable quantities of decomposing placental fragments were subsequently evacuated. This occurred in cases where assurances were given of the most careful examination of the placenta and membranes, but such assurances must in the circumstances be accepted with reservations.

With regard to cervical injuries it is frequently stated that no primipara at least escapes without some injury to the cervix. This is no doubt true, but the type of injury noted here is definite laceration including the muscle, and not simply injury to the mucous membrane, except in one case where there was however ulceration. In the nine cases where there was cervical tear without other injury, there was incomplete evacuation in addition in 4 cases. Where the cervical tear alone appeared to be the determining cause the cases were mild, all 5 making a good recovery, 3 having cellulitis in addition to endometritis, one endometritis alone, and one phlebitis and endometritis.

There seems to be no doubt that with 52% of cases of puerperal sepsis associated with incomplete evacuation, the need for early and energetic treatment is obvious, nor can there be any doubt that in dealing with the poorer homes such treatment can only be obtained satisfactorily in an institution under the direction of an experienced obstetrician. While in some cities there is considerable difficulty in obtaining such treatment, there is no difficulty in Birmingham for cases of notified puerperal sepsis, and the delay only too often seen in obtaining treatment is due to a reluctance to look upon the case as one of puerperal infection.

In the case of injuries more careful local treatment should be given than the usual daily washing which is all that is attempted while the patient remains at home. The occurrence of sepsis under these conditions appears almost inevitable, and the fact that it remains local in many cases and hence goes unrecorded is a testimony to the high natural resistance of many women. In three of these notified cases the sepsis was purely local but there was so much sloughing and offensive discharge that the cases were sent into hospital and

notified.

(a) Injuries in 44 cases.

Nature.

Perineal Tear alone 11, Cervical injury alone 9, Cervical and Vaginal injury 5, Vaginal injury 2, more than one injury including perineum 17.

Severity.

Very extensive 4, very severe 12, severe 15, slight 13.

(b) Incomplete evacuation in 49 cases.

The term "incomplete evacuation" includes cases resulting possibly from imperfect drainage of the uterus.

There were 4 cases in which masses of placenta were found, 21 cases in which small placental fragments were found, and 22 cases in which portions of membrane and blood clot only were present.

(c) Apparent determining cause of infection.

1. Injury and Interference 7.
2. Injury alone 11.
3. Injury and incomplete evacuation 16.
4. Injury, incomplete evacuation and interference 10.
5. Incomplete evacuation and interference 5.
6. Incomplete evacuation alone 16.
7. Interference alone 8.
8. Conditions of labour 3.
9. Not known 13.

III. The bacterial invasion in puerperal sepsis must
be largely due to accidental contamination with whatever organisms are in the neighbourhood or are introduced by the accoucheur. In this investigation the bacteriological reports were of varying value and will be detailed in the appendix.

IV. The date of onset of the illness is of some importance since more than half the cases are sent to hospital

for treatment after the first week of the puerperium, and in this connection it should be noticed that in 79 of the 89 cases the onset was definitely in the 1st week, while 52 cases (57%) should symptoms ^{beginning the} on first 3 days. In other cases however the most searching inquiry failed to reveal an earlier onset than those stated, and as there seems to be an impression prevalent among midwives that the onset of symptoms after the first few days cannot imply sepsis, this fact should be noted. It is possible however that with more frequent pulse and temperature records, some earlier indication would have been obtained.

The notifications correspond closely with the date of admission to Hospital.

Onset in Puerperium.

1st day 3, 2nd day 22, 3rd day 27, 4th day 7, 5th day 8, 6th day 7, 7th day 4, 8th day, 3, 9th day 2, 10th day 1, after 10th day 5, (these include 3 without satisfactory information)

V. Period in Puerperium when admitted to Hospital.

1st week 32, 2nd week 24, 3rd week 5, Later 11. In Institution for labour 13, treated at home 4.

VI. The high proportion of primipara 44% who suffer from puerperal sepsis is noticeable and corresponds to the age groups, 53% of the women being under 30.

VII. Parity. Primipara 40, Multipara 49, Death 19. (~~see separate analysis~~).
~~Premature Births 14, Full time Births 75.~~

VII. Age groups.

{	$\frac{20}{9}$	$\frac{20 - 30}{42}$	$\frac{30 - 40}{33}$	$\frac{40 +}{5}$
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Figures are given showing the mode of onset as far as could be ascertained and also a list of complications.

VIII. Apparent infection at onset.

Endometritis	68
Cellulitis	12
Local Sepsis	3
Phlebitis	2
Septicaemia	1
Peritonitis	3

IX. Complications.

Phlebitis	15
Cellulitis (with and without abscess formation)	17,
(with abscess)	5.
Cystitis	4
Peritonitis	9 (general).
Pneumonia, Bronchitis & Pleurisy,	10 (5 Septic pneumonia).
Septicaemia	8
Pyæmia	2
Fibrinoid infection	2
Eclampsia	1
Nephritis	3
Tonsillitis	1
Scarlet Fever	1

X.. The number of Deaths was 19 or 21.3%. The recoveries number 70 or 78%. There were however 20 cases with marked disability, i.e. 28% of the recoveries, and in 14 of these operations would subsequently be required for perineal repair.

The case death rate of the condition is always high, the present figure might be contrasted with the rates given by Osler for such conditions as those enumerated below.

Typhus	12 to 20%	Scarlet Fever	5 to 20%	Diphtheria	10 to 12%
Typhoid	7 to 20%	Pneumonia (Lobar)	30%	Erysipelas	2 to 7%

An analysis of all the cases in which death occurred is added to this paper. The points which appear to call for special comment are the high proportion of normal labours (49%) ,

and the high proportion of women in bad health, (42%). Twenty-five per cent of the deaths were in primipara.

Incomplete evacuation was found in 47% of the cases and in some cases very severe injuries were present. The actual cause of death was general peritonitis in 42% of the cases. In all but one case there was delay in securing hospital treatment. There can be no doubt that in a proportion of the cases the waiting policy was responsible for a fatal result.

XI Premature births numbered 14, of the 89 cases. Details of these are appended.

XII The infants were born alive in 75 cases but 5 died within a week.

Infant.

Living and healthy in	68 cases	
Living but feeble in	3 cases	(2 died within a week)
Living but injured in	4 cases	(3 died within a week)
Died during labour in	10 cases	
Died before labour in	4 cases	(macerated).

XIII The health of the mother prior to her confinement is given below. It will be seen that 64 or 71% were in good health.

XII Health of Mother.

Good 64. Debility 15. Bad 10.

Cause of bad health :- Venereal Disease 3 (2 Syphilis 1 Gonorrhea)
Pulmonary Tuberculosis 3. Nephritis 1. Asthma 1.
Bronchitis 1. Endocarditis 1.

XIV. Ante-natal Examinations.

In no case was any ante-natal examination made by a private medical practitioner nor was the urine examined.

In 2 cases midwives made ante-natal examinations, one as the patient fell ill and wished to know if labour was imminent, and in the other as the abdomen seemed unusually large.

In the latter a fibroid was found to be present after labour, but was not diagnosed by the midwife.

In 4 cases only had the midwives tested the patients urine, and then only once.

In 11 cases the patients had attended ante-natal clinics at Child Welfare Centres, at the request of the midwives, and 8 cases had attended the out-patient department of either the Maternity Hospital, the Queen's Hospital or the Women's Hospital.

It will be seen that the amount of ante-natal care received by the patients was not excessive.

XV
Vaginal Examinations during labour.

These varied from 1 to 6. In 9 cases no vaginal examinations were made as the head was on the perineum or the child partially or entirely born before the arrival of the doctor or midwife. In none of these cases was any interference required for delivering the child or placenta except in one where a fibroid complicated a breech delivery.

ABORTIONS ^{No}CERTIFIED AS PUERPERAL SEPSIS.

Total number notified in period 35.

{ Septic incomplete abortions 25.
{ Simple incomplete abortions 10

The cases are notified as cases of puerperal sepsis for admission to hospital, or are notified on admission to hospital. In 10 of the cases nothing suggestive of sepsis was present. Of the 25 septic cases, 13 were complicated by one of the conditions enumerated below, and 4 of the 13 died. The other 12 made a rapid and uninterrupted recovery after evacuation of the uterus.

Recoveries 31.

Deaths 4.

Death Rate 11.4%.

The death rate is lower than in ^ssepsis following labour, where it was 21%. It should however be calculated on the septic abortions when it is 16%. The cases in which death resulted are given in detail. Septicaemia of an acute type was the cause of death in each instance.

Period of Pregnancy.

2 months or less	8
2 to 3 months	16
3 to 4 months	7
4 to 5 months	3
5 to 6 months	1

In 16 cases the women were multipara who had never previously had a miscarriage. In 7 cases there had previously been one miscarriage, in 4 cases 2 previous miscarriages, and in 2 other cases 4 previous miscarriages. So that out of a total of 31 multipara 15 had had previous miscarriages, and in only one case was syphilis the cause, i.e. in one of the two cases in which there had been 4 miscarriages. In the other case with four miscarriages no cause could be found. The apparent cause where any could be found is detailed for each case below. Only 4 of the women were primipara, and in three of these the child would have been illegitimate, one of these acknowledged she had made every effort to procure an abortion and details of her illness are given in Case III of the "Deaths".

Apparant Cause.

Accident	5	(including falls).
Overstrain	7	(including lifting weights, much cycling or walking etc.)
Use of Vaginal Douche	2.	
Venereal Disease (Syphilis)	1.	
Pelvic disability	(Uterine Prolapse	2.
	(Ovarian Cyst	2.
	(Torn Cervix	1.
Self induced	2	Induced in hospital 1.
No obvious cause	12.	

Health of Mother.

Good health	27.	Poor Health	8.
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Complications.

Pnuemonia in 2 cases.	Pleurisy in 2 cases.
Phlebitis in 3 cases.	Cellulitis in 5 cases.
Cyslitis in 1 case.	Peritonitis in 3 cases.
Ovarian Abscess in 1 case.	

Deaths following abortions.

Case I. 3 months abortion.

Mrs. S. age 30, multipara 1 previous miscarriage, 3rd pregnancy. No reason given for abortion, attended by sister, doctor called in next day as patient was not well. On the 5th day an obstetrician was called in consultation, and the patient was sent into Hospital. The temperature was 100° and the pulse 100. There was an offensive vaginal discharge, and symptoms of general septocaemia with involvement of the joints. 6th day Temperature 101° Pulse 128. Delirium, Intra-uterine douche given, but the uterus was practically empty. 7th day Temperature 104°, Pulse 120. Repeated rigor, Pneumonia supervening + delirium. 8th day Death. No postmortem. No bacteriological findings.

Case II. 6 weeks abortion.

Mrs. C. age 36, multipara, 3 previous miscarriages, 14th pregnancy. Haemorrhage for 3 days followed by abortion. Doctor called in, patient sent to hospital on 4th day. On admission: Temperature 105° Pulse 120, R. 24. Uterus evacuated, foul putrefying placental remnants removed. Intra-uterine douche given. 5th day. Temperature 104°, Pulse 144, R. 48. haemoptysis, delirium, pulmonary embolus diagnosed. 7th day. Death. No post-mortem, No bacteriological examination.

Case III. 3½ months abortion.

N.H. unmarried, age 21, primipara, induced abortion by taking "pills" and used other means such as skipping. No local interference acknowledged. Finally aborted. Haemorrhage continued. She was attended by her mother. On the 4th day the doctor was called in, and she was sent to hospital. On admission Temperature 101°, Pulse 120, Placenta removed in a decomposing state. Copious intra-uterine douche given. 7th day. Temperature 100.5°, Pulse 106. Uterus again explored and portion of placenta removed. 9th day. Temperature 102°, Pulse 104, very ill, vaccine used, peritonitis. 15th day. Temperature 103°, Pulse 130. Rigors, pneumonia, vaccine continued. 20th day. Death. Post - mortem Notes. General peritonitis and broncho-pneumonia. Uterus septic and very foul.

Bacteriological Examination.

Blood Culture = Streptococci.
Uterine Swab = Mixed infection.
Autogenous vaccine prepared.

Case IV . 3 months abortion.

Mrs. A. aged 30, multipara, 8th pregnancy, no previous miscarriages, midwife and doctor attended. Patient did well till 9th day when there was headache, and some membrane was expelled. On the 11th day she was sent to hospital, on admission Temperature 101°⁰, Pulse 120. 12th day. Uterus was evacuated, placenta removed and intrauterine douche given. There was severe haemorrhage. 13th day. Temperature 101°⁰, Pulse 118, cerebral attack, left hemiplegia, cerebral embolus diagnosed. 14th day. Temperature 101°⁰, Pulse 110, lochia offensive. 18th day. Death. Post-mortem Notes. Uterus empty, placental site sloughy. Right ovary contained an abscess and was glued to the back of the uterus. Large septic focus in internal capsule of the brain.

Bacteriological Examination.

Uterine swab = Staphylococcus aureus^u in pure culture^{were}.
Blood Culture negative.

GENERAL CONCLUSIONS.

The modern view of puerperal infection may be considered to have been completely and ably set forth by Doctor Lea in his valuable book as long ago as 1910. Very little of material value has been added to our knowledge since then. Recently in a historical review Professor Adam~~me~~ emphasized the value of the work done by British Obstetricians as far back as the end of the 18th century, and the clear and accurate view of the whole question taken by Wright of Manchester in particular. In fact Wright appears to have advanced opinions which considering the relative knowledge of infectivity, practically agree with present day views.

In all modern text books the methods advocated for the prevention of puerperal infection are practically identical. They may be summarised as follows :-

1. To obtain aseptic conditions as for a surgical operation.
 2. To sterilise the hands and instruments, and to use sterilised gloves
 3. To thoroughly cleanse and as far as possible sterilise the vulva, and surrounding areas.
 4. To avoid unnecessary examinations or interference.
 5. To leave the uterus empty, and well retracted, and to ensure free drainage.
 6. To prevent injury if possible, and to repair and treat when present.
 7. To ensure strict cleanliness and care during the puerperium.
 8. To prevent the spread of infection from person to person.
- { No.6. includes ante-natal care to guard against complications requiring interference.

The importance of these rules cannot be exaggerated. Apart from confinements in institutions, none except possibly the 8th, can be said to be observed in ordinary midwifery practice. To obtain a fair standard of cleanliness in the lying-in room is possible in all but the poorest homes, and more could be done in this direction by insistence from the doctor and midwife. For the rest, the standard is still deplorably low, and it is difficult to raise it among midwives, while a bad example is set by medical practitioners. As regards the spread of infection from case to case, this is not commonly seen, but it still occurs at times. The possibility of infection from the accoucheur suffering from an infective coryza or similar condition is sometimes overlooked, and a case of this kind occurs in this series.

An authoritative and recent statement by Dr. Blair Bell published in 1921, emphasizes the importance of

avoiding unnecessary interference, including ^vVaginal examinations. The need for this warning undoubtedly exists, forceps are too frequently used simply to end labour quickly, and before full dilatation has occurred, causing severe injury; while the avoidance of vaginal examination is not seriously considered, and handywomen and midwives make them with quite unnecessary frequency. Dr. Bell suggests that interference should not be practised in unsuitable surroundings, and certainly in a city with ample accommodation in institutions it is surprising why more of the difficult cases are not transferred to them. The fact is that the task of delivering the child in these instances is undertaken light-heartedly, generally without any realisation of the possible struggle ahead;—having been undertaken it must be carried through. Much could be done by a more careful management of the puerperium, and a keen look out for the onset of infective symptoms. The nursing of the patient is of great importance, and the doctor should ascertain not only that the midwife knows her work, but that she is actually doing it satisfactorily. A closer supervision is undoubtedly needed. Once infection has occurred early treatment in Hospital under a skilled obstetrician is the best safe-guard, and cases should not be left to Resident Medical Officers, possibly recent graduates, till they have been instructed and proved their competence. Dr. Bell also emphasizes the importance of all perineal, cervical and vaginal injuries in the occurrence of infection, and this point is stressed in the correspondence which followed the appearance of his paper. He also dwells on the importance of good health in the patient, as adding materially to the natural resistance. In this series, 64 or 71.8% were healthy women, but among the deaths, 42% of the women were in bad health before labour. The influence of health on mortality is evidently marked.

At the Annual Meeting of the British Medical Association in 1920 an interesting discussion on puerperal sepsis took place. The question of the relative importance of autogenous and heterogenous infection was considered. It was generally agreed that in either case the organisms were usually introduced by the hands or instruments of the attendant, though the possibility of blood infection could not be overlooked. Two cases in this series are suggestive of such infection, in one the patient was suffering from a bad whitlow, and in the other scarlet fever was present as well as puerperal infection. Still cases of autogenous infection through the blood stream are unusual. If they resulted from simple septic foci of a sub-acute type, as in pyorrhoea, the number of cases of puerperal infection would be much greater, as such septic foci are so

frequently present. Injuries and imperfect emptying of the uterus must play an important part in lowering the local ^{resistance} and permitting infection to become generalised. There is a danger that a belief in the common occurrence of blood infection may lead to neglect of precautions during labour, and of early local treatment later. In this connection an article by Dr. Stark in the "Practitioner" is of interest.

A careful consideration of all modern teaching seems to show that while adequate emphasis is laid on the need for asepsis, and the importance of avoiding interference, the equally important questions of complete evacuation of the uterus, and adequate drainage are somewhat overshadowed. Even now there is ~~not~~ general recognition of the ^{importance of} ante-natal examinations for the avoidance of difficult instrumental deliveries, or to ensure that such cases should receive treatment in hospital under suitable conditions. The need for careful nursing and the continuance of antiseptic precautions during the early puerperium are seldom sufficiently insisted on, while apparently the importance of early and energetic treatment of puerperal infection is so obvious that it is hardly mentioned. In this connection the provision of really suitable hospital accommodation should be a primary consideration, and it is certainly desirable that it should be available in a General Hospital or a Women's Hospital rather than in an Infectious Disease Hospital. The importance of skilled treatment can ~~not~~ be exaggerated, and the patients should undoubtedly be under the care of an experienced obstetrician. There seems to be no reason why admission should be delayed till the medical attendant can feel justified in notifying the case as one of "puerperal fever". Under schemes for Maternity and Child Welfare it should be possible to ~~app~~rovide accommodation for all cases requiring special treatment during the puerperium, holding over the question of notification if desired. The present position appears to be due to the idea formerly prevalent that puerperal infection was a specific fever.

In regard to the midwife, apart from a constant endeavour to impress on her the importance of ante-natal work, of the use of strict asepsis in labour, and of avoidance of interference, the necessity of a careful examination of the placenta and membranes should be urged. It is also important that she should be able to give more attention to her patients, paying at least 2 visits daily during the puerperium. In order to permit this, "better remuneration is a necessity, and might be secured under the Insurance Act, possibly on a panel system.

While it is now proposed to lengthen the period of training for midwives it is important that the standard of the training should be raised and modernised. Some educational test for approved teachers of midwifery when these are practising midwives appears most desirable. Many of these approved teachers have been qualified for a very long period, and while excellent practical midwives have not advanced with the times, a periodical educational test would be of value.

The rules of the Central Midwives Board, too, might well bear revision, especially the rule permitting a midwife to wait 24 hours, after the temperature has risen to 100.4° before calling in medical help.

The standard of midwifery has undoubtedly improved, but much remains to be done. The response of medical practitioners to modern teaching is disappointing. Possibly the best form of midwifery service would be one in which all normal confinements were attended by midwives, who were obliged to call for medical help in all difficulties, such help should be given by obstetrical specialists, whether general practitioners or not, when necessary in institutions, and finally there should be satisfactory ante-natal supervision of all patients. It should be recognised that a normal labour is a physiological process, and medical interference should not be required, unless some complication exists. Such methods would greatly diminish the incidence of puerperal sepsis, but would not abolish it. Early and energetic treatment would, however diminish its mortality and severity. Present conditions are most unsatisfactory, and can and should be remedied. An educational campaign among women of all classes would do much, for by demanding a higher standard of midwifery they would secure it.

SUMMARY.

1. The present standard in midwifery among the artisan and working classes generally is unsatisfactory.
2. A large proportion of all cases of puerperal infection are avoidable with ordinary care.
3. Closer observation, careful nursing, and early treatment in the puerperium would prevent the occurrence of much of the severe puerperal infection and lower the mortality.
4. The training and remuneration of midwives requires improve-

ment, and should be associated with a demand for a higher standard in their work.

5. Suitable institutional accommodation for difficult labour, and for puerperal infection should always be available.
6. The importance of ante-natal supervision should be emphasized.

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| "Principles and Practice of Medicine" | Osler. | |
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APPENDIX I.

Deaths 19.

Infants. 15 living and healthy, 4 stillborn (1 dead prior to labour).

<u>Age Groups.</u>	20-30	30-40	40 +
	5	12	2

<u>Health.</u>	Good Health.	Some debility.	Bad health.
	11	3	5

The 5 cases in bad health include :- 1 asthma, 1 chronic Endocarditis, (no symptoms), 2 pulmonary tuberculosis, 1 bronchitis and Fibroid.

Parity. Primipara 5. Multipara 14.

Labour.

No interference except Vaginal examinations.	9.
Simple instrumental deliveries	3.
Difficult instrumental deliveries	3.
Instrumental deliveries with adherent placenta manually removed	3.
Placenta Praevia and version (Institution)	1.
	<u>19.</u>

Apparent cause of Sepsis.

Injury,	Interference only,	Incomplete evacuation only.
4	2	2

Incomplete evacuation & Injury.	Incomplete evacuation and interference and injury.
6	1

Not known.
4

Total 19.

Cause of Death. (Predominate feature).

General Peritonitis,	Septicaemia,	Pyaemia,	Endometritis.
8	5	2	4

Date of Onset in Puerperium.

1st day. 2nd day. 3rd day. 4th day. 5th day. 6th day.
1 4 7 1 2 1

No satisfactory record 3.

Day of Death in Puer^{per}ium. (All died in Hospital).

5th to 7th^{day} 7th to 15th^{day} 15th to 30th^{day} After 30th^{day}
3 6 7 5 6 4

(7 months after labour 1).

When^{two} ~~Day of~~ admission to Hospital.

For labour. 1st week. 2nd week & 3rd week. 4th week.
2 12 - - 4

Later 1.

CASES IN WHICH DEATH OCCURRED. (Summarised)

Case I. F.T. age 27, 2nd pregnancy (normal labour previously) General good health, good home, Midwife engaged, no Ante-natal examination. Labour, midwife sent for doctor as head not descending. Persistent Occiput Post^{erior} position diagnosed. Forceps used, great difficulty in application, perineum torn badly and stitched, no difficulty with the placenta. Child revived, a nice baby of normal size. Puerperium. On the 3rd day rise of temperature and pulse. Catheter was being used daily, and now a vaginal douche was given. A considerable portion of the fluid was retained, There was diarrhoea. The patient did not improve, and on the 7th day was sent to hospital. She was then too ill for operative interference. Collapsed and vomiting. Died on the 9th day. Post-mortem report. General peritonitis, A tear in the posterior and lateral Fornix admitted 4 fingers from the vagina to the peritoneal cavity.

Cause of death = General Peritonitis.
Cause of Sepsis = Injury.

Case II. L. age 38. 8th pregnancy, (normal labours previously) Pulmonary Tuberculosis, Poor home, midwife engaged. No Ante-natal examination. Labour Premature (8th month) onset with haemorrhage. Doctor sent for as midwife delayed in coming. Doctor diagnosed placenta praevia and sent patient to Hospital. Bipolar Cephalopelvic version performed under an anaesthetic. All usual antiseptic precautions taken. Child still-born. No difficulty with placenta. Puerperium 2nd day. Temperature 102° Intra-uterine douche given and ante-streptococcal serum. 3rd day. Uterus explored digitally, nothing found, intra-uterine douche given. Patient had a whitlow which was opened and drained, axillary glands enlarged. A rigor later in the day. The patient became progressively worse and died on the 11th day. Post-mortem report. Shaggy diffuse endometritis. Septic thrombosis in veins of left broad ligament.

Bacteriological findings. Whitlow pus = staphylococci.

Urine
~~Arterial~~ swab = Staphylococci & Streptococci.
Blood Culture = negative.

Cause of death = Endometritis and Septicaemia.

Cause of Sepsis = Interference, and Antogenous infection from whitlow possible.

Case III. A.B. age 29, unmarried primipara, general health good, entered workhouse some weeks before confinement. No Ante-natal examination. Labour. Full time, normal, all precautions taken, slight laceration of perineum repaired by one stitch, living healthy child. Puerperium 6th day. Temperature 99° , Pulse 100, but otherwise appeared very well. Got up on 11th day, had severe headache Temperature 99° , Pulse 88. Deafness became marked (slight before). 14th day. Phlebitis now definitely diagnosed, cough and quick respirations, Temperature 100.4° , Pulse 120, R.44. Pulmonary Emboli feared. 19th day. Temperature 105° , R.48, Pulse 130, vaccine (antogenous) was given and continued. 30th day. Death. Post-mortem Notes. Septic embolic pneumonia with much pleural exudate. Large septic softening thrombus in left saphenous vein. The brain was not examined, uterus and appendages normal. Cause of Death. Septic pneumonia followed septic phlebitis, and septicaemia.

Cause of Sepsis. Slight injury with absorption.

Bacteriological Findings. Blood Culture = Streptococci
Pleural effusion = "
(ante mortem)

Case IV. Mrs. M. age 35, 4th pregnancy, (previous labours normal, 2 premature). General health poor, anaemic. Good home. Midwife engaged, Ante-natal examination made at C.W. Centre.

Labour. Full time normal infant, small (5 lbs.).

Puerperium. Apparently normal, midwife ceased attendance on 10th day. Six days later the doctor was called in as the patient continued to "lose". The doctor attended daily, the patient ran a temperature of 101° for a few days, so it was decided to curette the uterus and give an intra-uterine douche. This was done at home under an anaesthetic, and the uterus appeared to contain nothing. The discharge had never been offensive. Two days later, the 32nd day, the temperature became normal, and the "loss" ceased. Patient seemed much better. A week later vomiting set in which rapidly became faecal in character. A gynaecologist was called in consultation, and advised admission to the Women's Hospital. Acute dilatation of stomach was said to be present. The House Surgeon washed out the stomach, evacuating 2½ pints of faecal matter. The abdomen was rigid and tender on the right side below the middle line. The patient died that night.

Post-mortem. Not performed.

Cause of Death. Peritonitis with intestinal obstruction following puerperal sepsis. (unconfirmed)

Cause of Sepsis. Not known.

Bacteriological Findings. None.

Case V. Mrs. R. age 45, 3rd pregnancy (2nd 12 years previously normal) General Health poor, much bronchitis, very stout. Home poor and dirty. Midwife not engaged. Ante-natal. Saw doctor 3 days before labour as she thought she had a tumour, doctor diagnosed pregnancy and advised the Maternity Hospital. Labour, premature 7th to 8th month. Midwife called in. Breech presentation, foetus dead, ^{macerated} insarated with offensive odour. Doctor called in as there was difficulty with the after-coming head. Chloroform and forceps used, delivery was difficult. The midwife delivered the placenta, but was doubtful as to whether it was properly examined. The patient was exhausted and vomiting. Puerperium. On the 2nd day the patient had a rigor. Temperature 102°, Pulse 120. Lochia offensive. 3rd day. Better. 4th day. Rigor, Temperature 103° Pulse 120. Abdominal distension and pain. 6th day. Patient admitted to Women's Hospital. 8th day. Severe haemorrhage, uterus explored and fragments of placenta and membranes removed with flushing, curette, mass found near cervix (House Surgeon). 9th day. Examined by Visiting Surgeon. Mass diagnosed as a fibroid. (Two present, one as large as an orange.) 21st day. Temperature had remained swinging with a rapid pulse. It was decided to perform a hysterectomy. A total hysterectomy with removal of the right appendages was performed. Abscesses in the fibroids ruptured into the peritoneal cavity during removal. 23rd day. The patient developed severe bronchitis. 29th day. The patient died with cardiac failure. No symptoms of peritonitis.

Post-mortem. None. Bacteriological findings. None.

Cause of Death. Puerperal Septicaemia.
Hysterectomy for infected fibroids.
Bronchitis and Heart Failure.

Cause of Sepsis. Incomplete evacuation of uterus and interference.

Case VI. Mrs. H. age 33, 2nd pregnancy (1st instrumental) General health good, Home good, doctor and handywomen engaged. No Ante-natal examination. Labour. Full time, forceps used without an anaesthetic for delay in 2nd stage, a narrow pelvis and much difficulty, no gloves or gown used. Perineum was torn but not stitched. Placenta came readily, apparently entire. Living healthy child with large haematoma on head. Puerperium. 2nd day. Rigor, abdominal pain, heavy loss. 3rd day. Rigor, severe headache, profuse sweats, severe abdominal pain. 4th day. Rigor. Abdominal distension, offensive discharge. 6th day. Sent to Hospital. Temperature 105°, Pulse 120, offensive lochia, old endocarditis (soft systolic murmur) 7th day. Operation, Cervix with double laceration. Perineum torn. Fragments of Placenta and Membrane removed, intra-uterine douche given. Tube placed in uterus, and nurse instructed to douche through the tube. Later in the day purpura developed, and areas of desquamation appeared everywhere. 9th day. Temperature 104°, Pulse 112, intra-uterine tube withdrawn. Delirium. Bacteriological report received. 10th day. Temperature 104°, Pulse 120, Cerebral embolus with loss of speech and of facial movements. 12th day. Temperature 103°, Pulse 120, anti-streptococcal service given. Delirium. 13th day. Temperature 106°, patient died ^{momentary} cyanosed with rapid respirations. Pul. embolus suspected. Post-mortem. None. Bacteriological Report. Blood = Culture gives profuse growth of a streptococcus. Urine = a streptococcus and a ~~grave~~ Gram negative diplococcus in culture.

Cause of death. Puerperal Septicaemia.

Cause of Sepsis. Interference and injury ^{with} incomplete evacuation.

Case VII. Mrs. D. age 22, 1st pregnancy, General Health good, home good, midwife engaged. No ante-natal examination. Labour. Full time, normal. Perineum torn (apparently not noticed by midwife) Placenta apparently entire. Healthy living child. Puerperium. 2nd day. Lochia offensive. 8th day. Lochia remained offensive, Temperature 99°, Pulse 90. Headache. 9th day. Temperature 103.6°, Pulse 96, rigor, headache, doctor sent for. 10th day. Doctor visited and sent patient to hospital Temperature 103°, Pulse 134. Offensive discharge. 12th day. Operation, perineum torn and vaginal mucosa involved. Cervix torn and pus escaping. Uterus much enlarged. Portion of placenta and membranes removed with a blunt flushing curette. - The temperature contained high (swinging in

character) with a rapid pulse. Nephritis developed in the 4th week. Staphylococcal infection of urine found, and all an antogenous vaccine given. In the 3rd month the patient was transferred to another hospital. Pericarditis developed. The patient remained very ill and died, 7 months after her confinement. Post-mortem. Nephritis pyaemia myocardial abscesses. General anasarca. An infarct present in the upper lobe of each lung. Acute endocarditis present. Kidneys show Nephritis, and one abscess was found. Peritoneal adhesions, round ovaries and tubes, attaching to the pelvic colon. Gram stained sections of endocardium and kidney show typical staphylococci present.

Bacteriological Findings. Blood = Nil. (No examination after 1st 3 weeks). Uterine swab = a streptococcus. Urine = a staphylococcus albus.

Cause of Death. Puerperal septicaemia. Infective Endocarditis. Sub-acute Nephritis.

Cause of Sepsis. Injury and incomplete evacuation.

Case VIII. Mrs. O. age 37, 4th pregnancy (3 previous labours normal) Poor health (probably tuberculous, 2 previous attacks of plurisy). Home fairly good. Midwife engaged. Urine tested. No other Ante-natal examination. Labour. Full time normal, but patient became exhausted, doctor called in, forceps used under an anaesthetic. Placenta came easily, apparently entire. Healthy living child. Puerperium. 3rd day. Temperature 100.4°, Pulse 108. Nausea. 4th day. Temperature 100.2°, Pulse 100, doctor gave intra-uterine douche. 5th day. some improvement. 10th day. Still running a temperature from 99° to 101°, Pulse 100. 11th day. Patient sent to hospital. Abdomen tender. 12th day. Operation, cervix torn laterally. No perineal tear. Uterus evacuated of portions of membrane, blood clot, and some fragments of decomposing placenta. Intra-uterine iodine douche given.. Patient had active pleurisy (dry) on right side. 15th day. Patient did not rally and died on this day.

Post-mortem. None. Bacteriological Findings. Blood = Nil. Intra-uterine swab = Staphylococcus Albus and a Streptococcus. Urine = B. Acidæ Lactinæ.

Cause of Death. = Puerperal Endometritis.

Cause of Sepsis. Injury and Incomplete Evacuation.

Case IX. Mrs. H. Age 37, 4th pregnancy, (previous labours normal). General health fair, some malnutrition from poor food, and worked till the 9th month at charring. Home fairly good, midwife engaged. Urine tested, no other ^aAnte-natal care. Labour. Full time normal labour, 2 vaginal examinations. No injury, no difficulty with placenta. Puerperium. 5th day. Abdominal pain; Temperature 101.4° , Pulse 98. 6th day. Temperature 100.2° , Pulse 78. No offensive lochia. Uterus well involuted. 7th day. Temperature 97° , Pulse 72. Apparently well. 10th day. Temperature 100° , Pulse 76. No other symptoms. 11th day. Temperature 97.6° , Pulse 78. Midwife ceased attendance.

Twelve days later the patient was sent into the infirmary by the doctor who was called in by the husband. On admission Temperature 100° , Pulse rapid and feeble. Very ill, dulcers over both bases, and moist rales over both lungs. Attacks of severe abdominal pain, uterus enlarged, with yellow discharge. Patient had been ill since the midwife ceased attendance with attacks of acute abdominal pain. Operation was considered inadvisable owing to lung condition. 27th day. Patient died.

Post-mortem. Free fluid in abdomen. Dense adhesions round the uterus with the omentum. Left broad ligament oedematous with a deep seated abscess. Uterus soft and pulpy but empty. Both lower lobes pneumonic. Blood stained fluid in pleura.

Bacteriological examination. None.

Cause of Death. Puerperal cellulitis and peritonitis and a secondary pneumonia.

Cause of Sepsis. Not known. Probably absorption from abrasion.

Case X. Mrs. L. age 27. Primipara, General health good. Good home, engaged doctor and handy-woman. No ante-natal examination. Labour. Full time, vertex presentation, some delay in 2nd stage, Forceps used, great difficulty in application (5 attempts) some chloroform used. No gloves or gown. Patient severely torn. Perineum repaired with 2 stitches. Cervix and vagina also torn. Placenta delivered normally, apparently entire. Child

Perineum

stillborn, head crushed with forceps. Patient exhausted, no douche given. Puerperium. 1st day. Much exhaustion and distress, sent into hospital. Condition on admission :- Temperature 98°, Pulse 136. Perineal tear involving ~~ratum~~ ^{rectum}, stitches ineffective, removed. Much laceration of vulva and vagina, laceration of cervix, extending to left broad ligament, much abdominal distension. Local treatment. 5th day. Temperature 101°, Pulse 130. Severe abdominal pain. 6th day. Intra-uterine douche given uterus was empty, much local sepsis. 7th day. Laparotomy, blood and pus in Pouch of Douglas, drained per abdomen. 8th day. Vomiting becoming faecal. 9th day. Death.

Post-mortem. None. Bacteriological Findings. None.

Cause of Death. Septic Peritonitis.

Cause of Sepsis. Severe injuries.

Case XI. Mrs. T. age 38. 10th pregnancy, (previous labours normal) General good health, good house, engaged doctor and midwife. No Ante-natal examination. Labour. Normal 15 hours, child healthy and living, 3 vaginal examinations, usual precautions. Puerperium 3rd day Temperature 102°, Pulse 100. No rigor. Vaginal douching ordered. 8th day. Temperature and pulse had remained high, abdominal pain and distension and yellow discharge. 10th day. Sent to hospital Temperature 103.4° Pulse 144. R.44. Pneumonia over both bases but more extensive on left side. Diarrhoea, abdominal tympanites. 11th day. Death.

Post-mortem. No laceration of vagina. Foul brown discharge. Cervix swollen. Endometrium thickened and congested. A generalised foully septic peritonitis with much free fluid and pus. Blood stained fluid in both pleural ^{cavities} and early pneumonia. Blood stained fluid in pericarditis, etc.—

Bacteriological Findings. Smear from uterine endometrium gives numerous streptococci.

Cause of Death. Septic peritonitis

Cause of Sepsis. Unknown.

Case XII. Mrs. C. Age 46. 13th pregnancy (previous labours 6 Forceps cases 12th B.B.A.) General health good. Home poor and dirty. Midwife engaged, no Ante-natal examination. Labour. Full time vertex L.O.A. delay in the 2nd stage. Midwife sent for doctor, two attended. Chloroform and forceps used, three attempts at delivery failed. Version performed. Forceps failed to deliver after-coming head. Head crushed, and finally delivered by manual traction. No gloves used, one Doctor wore ^{own}gown. No difficulty with placenta. Some injury noticed. Vaginal douche given. Large child, crushed head. Puerperium. 2nd day. Temperature 98°, Pulse 100. 3rd day. Temperature 99°, Pulse 100. 5th day. Temperature 101° Pulse 116. Patient seemed ill, sent to hospital. Condition on admission :- Temperature 108°, Pulse 128. Abdominal distension. Severe perineal tear involving ^{rectum}section, portion of left labium magus ~~encasing~~, sloughing surface, foul brown discharge and ~~fæces~~ ^{pus} escaping from the vagina. Post-vaginal wall torn and ragged. Cervix torn and ragged, almost indistinguishable. Patient very ill, no definite signs of peritonitis. 6th day. Death.

Post-mortem. None. Bacteriological Findings. None.

Cause of death. Puerperal Septicæmia ^{æmia} and Local Sepsis.

Cause of Sepsis. Severe Injuries.

Case XIII. Mrs. F. age 24. Primipara. General health good. Good home, doctor and handy-women engaged, no Ante-natal examination. Labour. Full time, Vertex, delay in the 2nd stage, small pelvis, forceps used, no gloves or gown^{worn}, some chloroform given, placenta adherent, removed manually in pieces. No douche. Baby alive and healthy. Puerperium. Lochia dark and somewhat offensive, some pain in the back. No temperature record. Got up on the 11th day and then her feet and hands began to swell. Doctor called in again on the 14th day, he continued to attend, no rise of temperature noted, sufficient urine passed. Patient said to have slight fits and to be hysterical. 20th day. Patient was sent into the mental ward at the Poor House. 24th day. Patient found to be running a temperature so transferred to a sick ward. Urine solid with albumen^{urine} on boiling, and an offensive vaginal discharge ~~was present~~. The uterus was enlarged and tender, mental symptoms considered uraemic. Anti-streptococcal serum was given. 28th day. Intra-uterine^{uterine} douche was given and shreds of membrane and pus were washed out. The cervix was discharging pus. 29th day.

Total suppression of ^{urine} ~~serum~~. 30th day. Death.

Post-mortem. None. Bacteriological Findings. None.

Cause of Death. Septic Endometritis and Nephritis.

Cause of Sepsis. Interference, manual removal of placenta etc.

Case XIV. Mrs. M. age 35, 2nd pregnancy (1st normal labour). General health good. Good home, midwife engaged, no Ante-natal examination. Labour. Full time, normal, healthy living child, no difficulty with placenta. Puerperium. 5th day. Rigor, pain in side, some shreds of membrane expelled. 6th day. Temperature 100.6°, Pulse 120. Abdominal pain, headache, doctor called in. 7th day. Temperature 103.2°, Pulse 124, vomiting, lochia hot offensive. 8th day. Temperature 102.6°, Pulse 120, midwife pressed removal to hospital, sent into hospital. Condition on admission :- Temperature 104°, Pulse 120. Heavy sweats, tympanitis, copious greenish vaginal discharge, slightly offensive, cervix soft, lacerated on left side. 9th day. Temperature 101°, Pulse 112. Intra-uterine douche given and fragments of adherent placenta removed. 13th day. Autogenous vaccine given, temperature and pulse unsatisfactory. 19th day. Patient very ill. Temperature 98°, Pulse 152, R.40. 20th day. Death.

Post-mortem. Generalised peritonitis, very little free fluid, sticky exudate, inspissated collections of greenish lymph between intestinal coils, over liver etc. No abscess formation. Thorax not examined.

Bacteriological Findings. Blood and Urine culture = Gram positive cocci
Uterine swab = Streptococci (short chains).

Cause of Death. Septic Peritonitis and Endometritis.

Cause of Sepsis. Incomplete evacuation and injury.

Case XV. Mrs F. age 33, Primipara, General health good, good home, no Ante-natal examinations. Urine examined once, Midwife engaged and doctor. Labour. Full time, vertex, weak "pains" midwife sent for doctor when dilatation was almost complete. At least 5 vaginal examinations. Forceps used with Chloroform.

Doctor used gloves, but no gown. Healthy living child. Placenta adherent and removed manually in small pieces after 1½ hours. Perineum torn, repaired with 2 stitches. Intra-uterine douche given. Puerperium. 3rd day. Temperature 99, Pulse 80. Lochia slightly offensive, rigor, patient sent into hospital, said to have had rigor on previous day also. Condition on admission :- Temperature 103°, Pulse 160. Abdomen distended, much laceration of the vagina, just inside the orifice, sloughing and septic. Cervix lacerated; local treatment given. 6th day. Temperature 100°, Pulse 152. Intra-uterine douche given as patient very ill and delirious, uterus apparently empty, severe sloughing of vagina and cervix and much local discharge. 9th day. Rigors, delirium, incontinence of urine and faeces, Ante-streptococcal serum now given. 12th day. Death.

Post-mortem. Uterus well involuted, a few tags of septic blackened placental tissue, still adherent to fundus. Venous channels at fundus filled with thick yellow pus, very little peritonitis.

Bacteriological Findings. Blood Culture, negative.
Urine = Coliform organisms and staphylococci.

Cause of Death. Septic endometritis.

Cause of Sepsis. Injury and incomplete evacuation.

Case XVI. Mrs. S. age 32, 2nd pregnancy. (1st labour normal) General health fair, (anaemic), good home, engaged doctor and midwife, attended Ante-natal clinic and advised to go to Maternity Hospital, but did not go. Labour. Full time, vertex, doctor delivered with forceps using chloroform, 4 vaginal examinations, no gloves or gown worn, healthy living baby. Placenta adherent, removed manually in an hour in small pieces. Vaginal douche given by midwife under doctors instructions. The patient collapsed a few hours later, and Doctor was called in again. Puerperium. No temperature record. Patient seemed weak but otherwise well, occasional headaches. Doctor ceased attendance on the 8th day and the midwife on the 12th day. On the 14th day the patient got up and had a severe haemorrhage, the doctor was sent for. 25th day. As haemorrhage continued a gynaecologist was called in and advised hospital. On admission :- Temperature 101°, Pulse 136, anaemic, blood stained vaginal discharge, not offensive. 26th day. Temperature 103°, Pulse 128.

Operation, Cervix dilated and the uterus found to contain masses of placenta. Uterus was curetted, douched and packed. 33rd day Temperature and pulse remained swinging. A mammary abscess developed, morphia required. 40th day. Death.

Post-mortem Notes. Pyaemia abscesses in both lungs subjacent to pleura. Uterus small, endometrium at fundus the seat of a septic infection. Right ovary contained an abscess with thin greenish foul pus. No abscesses in the liver, kidney or spleen.

Bacteriological Findings. None.

Cause of Death. Septic endometritis and pyaemia.

Cause of Sepsis. Incomplete evacuation of the uterus.

Case XVII. Mrs. B. age 33, 6th pregnancy (4 normal labours 1 abortion) General health good, good home. Doctor and handy-woman engaged, no Ante-natal examinations. Labour. Full time, normal, child alive & healthy, no difficulty with placenta. Puerperium. 4th day. Rigor, Temperature 104° , Pulse 120. 5th day. appeared well, tonic given. 11th day. Nurse and doctor ceased attendance. 23rd day. Doctor called in, very ill, Rigors. Temperature 104° , pain in lower abdomen. Very little tenderness, no distension. 27th day. Gynaecologist called in consultation, advised hospital. On admission :- Temperature 102.8° , Pulse 136, R.40. Delirious, heavy sweats, thickening in left broad ligament. 29th day. Incontinence of faeces, rigors, vaccine (antogenous) given. Temperature 103.8° , Pulse 130, R.28. 31st day. Cough, pain in joints, face swollen, some delirium, vaccine given. Temperature 103.4° , Pulse 136, R.32. 35th day. Death.

Post-mortem Notes. Both lungs show patchy septic pneumonia. Free fluid in peritoneum, purulent round the uterus. Septic infarctis in spleen, uterus appears fairly healthy.

Bacteriological Findings. Blood = pure culture of streptococcus.

Cause of Death. Puerperal septicaemia, Peritonitis.

Cause of Sepsis. Not clear. (Probably some injury, large child).

Case XVIII. Mrs. M.C. age 38, 9th pregnancy (All previous labours normal) General health good, (chronic endocarditis) Home small and clean. Medical students and handywoman engaged. ^{post-partum} No Ante-natal examination. Labour. Full time, normal labour some*pp.h. Living healthy baby, No difficulty with placenta. ^{haemorrhage.} Puerperium. 3rd day. Severe abdominal pain, rigor. Temperature 103°. 4th day. Temperature 101°, severe headache and abdominal pain. Pain and tenderness over right thigh. Phlebitis. 5th day. Temperature 103.5°, Pulse 148. Lochia offensive sent to hospital. Intra-uterine douche given, fragments of membrane evacuated, severe rigor. 6th day. Temperature 103°, Pulse 145. Anti-streptococcal serum given, patient very ill. Cyanosed. 7th day. Death.

Post-mortem Notes. Peritoneum contains turbid fluid and sticky lymph over posterior aspect of the uterus and appendages. Uterus soft and sub-involuted. Endometrium greenish brown, pale and discoloured. No retained fragments, puss oozing from lymphatic channels near the cervix. Septic changes in left saphenous veins. Lungs showed a early broncho-pneumonia. Heart showed an old endocarditis of the mitral valve and a recent remitt infection.

Bacteriological Findings. Blood Culture (6th day) Short chained streptococcus.

Post-mortem. Smears from pus in uterus and in ^{lining} venis showed similar organisms.

Cause of Death. Septicaemia, Peritonitis.

Cause of Sepsis. Incomplete evacuation.

Case IX. Mrs. T. age 36, 7th pregnancy (5 normal labours, 1 miscarriage) General health poor, asthmatic. Home poor, fairly clean. Midwife engaged, no Ante-natal examination, urine examined. Labour. Full time, normal but anterior lip of cervix prolapsed and was lacerated and oedematous. Living healthy baby. Placenta entire, but membranes ragged, patient tired, laboured breathing. Puerperium. 3rd day. Rigor. Temperature 102°, Pulse 126. Pain and tenderness over lower abdomen, doctor sent for. 4th day. Temperature 101°, Pulse 80, much the same, sent to hospital. On admission :- Temperature 100.8°, Pulse 120, R.32. Uterus bulky and full of clot. Intra-uterine douche given. Clots and fragments of membrane evacuated, anti-streptococcal serum given. 5th day. Some pleuritic pain.

Vaginal discharge offensive. 6th day. Patient very collapsed. 7th day. Death.

Post-mortem. Refused. Bacteriological Findings. None.

Cause of Death. Acute endometritis.

Cause of Sepsis. Incomplete evacuation and injury.

APPENDIX II.

PREMATURE BIRTHS.

During the investigation, 89 cases of puerperal sepsis were notified, 75 being full time cases and 14 premature births. Of the 14 premature births 5 were 7 months and 9 between 8 and 9 months.

DETAILS OF CASES.

7 months gestation.

1. Child feeble, died in 6 hours, easy labour.
2. Placenta Praevia. Child Stillborn.
3. Uterine fibroid. " "
4. Macerated foetus. " "
5. Syphilis. " "

8 and 8½ months gestation.

1. Placenta Praevia. Child Stillborn.
2. " " " "
3. Twins. Both alive and healthy.
4. " " " "
5. Adherent placenta, Alive healthy child.
6. Mother aged 14. Small and poorly developed.
Working throughout in factory.
Child alive.
7. Placenta Praevia. Stillborn.
8. Transverse Presentation. Living Child.
9. Twins. Both living.

In 6 of the 14 cases the children lived giving with the twins 9 healthy children.

Totals.

Placenta Praevia	4,	Tumour	1,	Transverse Presentation	1.
Twins	3,	Death of foetus	1,	Adherent Placenta	1.
Syphilis	1,	Child feeble	1,	Child Mother	1.

APPENDIX III.

BACTERIOLOGICAL EXAMINATIONS.

Bacteriological examinations were made more or less systematically in two of the Hospitals in which the patients were treated. The specimens were taken by the Resident Medical Officers.

Hospital A. Number of cases admitted 46.

Urine examination. 21 cases examined.

Reports :- 3 Sterile
2 mixed streptococcal infections.
6 Staphylococcal infections (2 mixed infections)
7 Coliform organisms found.
2 Bacillus Coli found.
1 Diphtheroid Bacillus found.

The contaminating organism was usually one of the coli group.

Blood examinations. 23 cases examined.

Reports :- 8 Sterile
2 streptococcal infections.
9 Staphylococcal infections (1 mixed infection).
4 Coliform organisms found. (1 mixed infection).

Uterine swab. 16 cases examined.

Reports :- 1 Sterile
9 Streptococcal infections (3 mixed infections with staphylococci)
4 Staphylococcal infections.
2 Coliform organisms found.

In a large proportion of the cases with a full examination was made or none.

Hospital B. Number of cases admitted 31.

Urine examination. 7 cases.

Reports :- 3 Sterile
2 Streptococcal infections (1 mixed with Staphylococci).
1 Staphylococcal infection.
1 Coliform organisms found.

Uterine swab. 8 cases examined.

Reports :- 3 Sterile
3 Streptococcal infections.
2 Staphylococcal infections.

Blood examinations. 12 cases.

Reports :- 9 Sterile
2 Streptococcal infections.
1 Staphylococcal infection.

In the majority of cases either a full examination was made or none.

The predominance of the streptococcal and staphylococcal infections is noticeable. Autogenous vaccines were used in hospital B. with good results in several cases.

APPENDIX IV.

ILLUSTRATIVE CASES. (Summarised.)

Case I. Midwives Case. Normal Labour. Incomplete Evacuation.

Mrs. S. age 18, Primipara, good health. Labour, Midwife in attendance 4 hours before birth of child, no enema given. 2 vaginal examinations made. Placenta gently expressed 20 minutes after the birth of the child, apparently entire, carefully examined, no injury. Puerperium. 7th day. Patient had done well but had a rigor at night, midwife found her vomiting, lochia pale but not offensive. Temperature 100° , Pulse 96. At night when midwife revisited Temperature 105.6° , Pulse 120. Aspirin Grain 10 was given. 8th day. Temperature 103.8° , Pulse 132, R.36. Pain in arms and legs. The doctor was now sent for. He called and returned in the evening, then patient was restless and vomiting. Temperature 103° , Pulse 120. She was removed at 10 p.m. to the Hospital. On admission :- Temperature 103° , Pulse 120. Intra-uterine douche given after digital evacuation of the uterus, fragments of placental tissue removed. 9th day. Temperature 102° , Pulse 124. Better. 10th day. Temperature 99° , Pulse 116. 11th day. Temperature 98.6° , Pulse 96. Very well.

Result Recovery. No disability.

Bacteriological Findings. Uterine swab = Staphylococcus Citrus.
Blood Culture Negative.

Case II. Dr. & Midwife in attendance. Difficult instrumental Delivery.

Mrs. P. age 32, Multipara, 4th pregnancy, all 3 previous labours had been very tedious, the last had been attended by the same doctor and midwife as in this case. The midwife states she reminded the doctor of the difficult instrumental delivery then effected. No ante-natal examination of any kind was done. Labour. Onset 4.30 a.m. midwife arrived 5 a.m., but ^{was} backwards and forwards all day, sent for doctor 10 p.m. he examined and returned 2 a.m. Baby born 3.20 a.m. At least 4 vaginal examinations were made. The home was clean and there

was ample bed and personal linen. The doctor wore no gown or gloves. Version was performed and instruments were required for the after-coming head as the pelvis was very small. The child was injured, and was born dead. The forceps were placed before being used in a jug and boiling water and lysol poured over them. There was no difficulty with the placenta, and there was no fresh perineal tear. No douche was given after labour. Puerperium. Vaginal douche given twice daily at doctors request. 3rd day. Rigor, headache, lochia normal, Temperature 102° , Pulse 100. 4th day. Temperature 102° , Pulse 100. Lochia scanty. 5th day. Temperature 102° , Pulse 90. Abdomen distended. 6th day. Temperature 104 , Pulse 110. 7th day. Temperature 103° , Pulse 88. 8th day. Sent into hospital. On admission :- Temperature 102.8° Pulse 110. heavy sweats, rash, uterus up to umbilicus and tender, cervix tender, and badly torn, yellow inoffensive discharge. 9th day. Intra-uterine douche given, debris and clots evacuated. Temperature 99.6° , Pulse 96. 10th day. Temperature 101.5° , Pulse 96. 11th day. Temperature 102° , Pulse 110. 12th day. Temperature 98.4° , Pulse 92.

Result :- Recovery.

Bacteriological Findings. Blood Culture = Staphylococci.
Urine Culture = Sterile.

Case III. Doctor and Handywoman in attendance. Normal Labour.

Mrs. H. age 23, Primipara, some debility, doctor engaged at 7th month, no ante-natal examination of any kind. Labour. A good house and clean surroundings. Ample bed and personal linen. Onset at 7 a.m. Handywoman in attendance 11 a.m. Enema given, swabbed vulva with lysol, made two vaginal examinations and sent for doctor at 2 p.m. Doctor made two vaginal examinations, no difficulty. Placenta and membranes apparently entire, examined by doctor, perineum torn, and repaired by one suture. Baby well and healthy. Puerperium. 2nd day. Patient was feverish and had a quick pulse. 3rd day. Headache, still feverish. 4th day. Abdominal pain. Hot fermentations ordered. 5th day. Rigor, lochia offensive. 6th day. Sent to hospital. On admission :- Temperature 101° , Pulse 120. Uterus at umbilicus, abdominal tenderness. Perineum torn and not united, digital evacuation of uterus. Small portions of placenta removed. Intra-uterine douche given. 7th day. Temperature 100.8° , Pulse 112, Better. 14th day. Temperature and pulse normal. 17th day. Cystitis developed, pus in urine. Three weeks later Pelvic Cellulitis developed, irregular

temperature. Three weeks later. Broad ligament abscess, definitely diagnosed, opened and drained. Patient did very well, discharged 3 months after admission, well, but to return later for perineal repair.

Result :- Recovery.

Bacteriological Findings. Delay in sending specimens, unsatisfactory results.

Case IV. Doctor & Handywoman in attendance. Instrumental Labour.

Mrs. T. age 24, Primipara, no ante-natal examinations by own doctor, attended ante-natal clinic. Labour. Good home, ample supply of linen etc. Onset 12 midnight, Handywoman arrived 1.30 a.m. went home and returned at 4 a.m. States she made no vaginal examination till 2nd visit, Enema then given, and patient swabbed up and examined, doctor sent for and arrived 8 a.m., examined patient, wore no gown or gloves, applied forceps, after pouring boiling water and lysol over them, perineum torn, no difficulty with placenta, examined by doctor, perineum repaired. Healthy infant. Puerperium. Patient did well till 5th day, then rigors, headache, and vomiting supervened. Temperature 104° , vaginal douche ordered. 6th day. Some improvement, temperature 99° . 7th day. Rigor again, specialist called in consultation, and he advised hospital. On admission :- Temperature 98.4° , Pulse 104. Uterus evacuated at once, it contained large masses of placenta and much blood clot. Intra-uterine douche given. 17th day. The temperature and pulse were normal for the first time, patient seemed better. 21st day. Temperature 101° , Pulse 80. 23rd day. Temperature 101° , Pulse 100. Phlebitis developed in both legs. Subsequently there was gradual improvement. Patient discharged 2 months after admission.

Result :- Recovery.

Bacteriological Examination. Urine Sterile.
Blood Culture = Streptococcus and an anaerobic Bacillus.
Uterine swab = An anaerobic Bacillus and ~~a~~ Staphylococci.

Case V. Midwife and Pupil-Midwife in attendance. Normal Labour.

*post partum
haemorrhage.* Mrs. M. age 36, Multipara, 12th pregnancy, all normal labours, no ante-natal examinations. Labour. Midwife sent for at 3.30 a.m. Pupil midwife arrived 4 a.m. Swabbed patient and examined per vagina, baby born at 4.45, midwife arrived just after. Placenta expelled readily, apparently entire, some p.p.h. ergot given. The house and bed were very dirty. There was some fairly clean bed and personal linen, clean rags used for perineal pad. Living healthy child. Puerperium. 3rd day. Temperature 101.4°, Pulse 144. Some abdominal pain, and pain on micturition. Castor oil given, second visit paid, Temperature 102°, Pulse 116, Enema given, there was much pain. Temperature now fell to 99°. 4th day. Temperature 98.4°, Pulse 96. Patient appeared better, still abdominal pain. 7th day. Midwife rather late in arriving, husband called in doctor as the patient had much pain, Temperature 101°, Pulse 120, doctor sent patient to hospital. On admission: Temperature 102.4°, Pulse 132, uterus evacuated by digital curettage, a piece of placenta as large as the palm of the hand found in the uterus almost organised to placental site. This was removed with difficulty. The uterus was swabbed with iodine and packed with gauze. 8th day. Temperature 102.4°, Pulse 132. 9th day. Temperature 98.6°, Pulse 80, much improved, subsequently did well, discharged in a fortnight.

Result :- Recovery.

Bacteriological Examination. Uterine swab Culture gave a Streptococcus.

Case VI. Midwife in attendance, Normal Labour, P.P.Haemorrhage.

Mrs. T. age 39, Multipara, 2nd pregnancy, first child born 10 years before. Patient was examined abdominally by midwife as the menstrual flow continued although she was pregnant, and because she was abnormally "large". The midwife sent the patient to the ante-natal Clinic, where she was advised to go to the Maternity Hospital, and arrange for admission for her confinement. She did nothing however. Labour. Good surroundings, ample clean linen. Onset 5.30 a.m. Midwife arrived 9 a.m., an enema was given. Patient was swabbed, two vaginal examinations were made. During birth of child there was much haemorrhage, also following the delivery of the placenta.

Placenta was apparently complete, ergot was given, the uterus did not contract well, healthy infant. Puerperium. Some abdominal pain but otherwise well till 3rd day. Temperature 103°, Pulse 120, doctor sent for at once. He ordered vaginal douche and opening medicine. 5th day. Temperature 105°, Pulse not recorded. Lochia offensive and purulent, douched 2 hourly. Patient unwilling to go to hospital. 6th day. Temperature 103°, Pulse 120. Patient consulted to go to hospital. On admission :- Uterus enlarged and tender, evacuated under an anaesthetic, small portions of placenta and blood clots removed digitally, and an intra-uterine douche given. Fibroid in uterine wall diagnosed. 8th day. Temperature 103°, Pulse 130. 9th day. Temperature 98.4° Pulse 112, doing well. 16th day. Temperature 100°, Pulse 104. from this day the temperature continued irregular and there were finally rigors and vomiting. Fibroid infection was diagnosed. Four weeks after admission sub-total hysterotomy was performed. The fibroid showed advanced degeneration and pus formation, and was the size of a foetal head.

Result :- Recovery.

Bacteriological Findings.

Blood Culture = Staphylococcus Aureus and a Diptheroid Bacillus

Case VII. Midwife and Midwife-pupil in attendance, Normal Labour.

Mrs. H. age 26, Primipara, No ante-natal examination. Labour. Good home, clean linen etc. Enema given etc. 3 Vaginal examinations, one by pupil, no difficulty. Healthy living baby. Puerperium. 3rd day. Temperature 99.6°, Pulse 96. 4th day. Temperature 102.4°, Pulse 108. Temperature and pulse then remained below 100 till 10th day. Temperature 103°, Pulse 108. Late that evening the doctor was called in, ordered vaginal douching. 11th day. Temperature 102°, Pulse 116, sweating, headaches, pain in limbs. 16th day. Patient was able to rise. case not notified. Midwife ceased attendance, doctor still calling. 18th day. Phlebitis developed. Three weeks later patient sent into hospital at her own request. Veins thrombosed from groin to ankle on both sides. Enlarged glands. Temperature 101°, Pulse 130. Gradual improvement. Cellulitis was present forming a large mass on the right, and a smaller one on the left. No severe lacerations present. Patient discharged 6 weeks after admission.

Result :- Recovery.

Bacteriological Finding. Cultures from Blood and Urine,
Negative.

In this case the pupil midwife was suffering from a severe nasal and pharyngeal catarrh. Several cases attended by her at this time had rises of temperature. No other case was notified.

